Published in final edited form as:
World J Surg. 2009 May ; 33(5): 910–917. doi:10.1007/s00268-009-9938-0.

Smoking Knowledge, Attitudes, Behavior, and Associated Factors among Chinese Male Surgeons

Abstract

Background—The purpose of this study is to understand and assess the smoking knowledge, attitudes, behavior, and associated factors among Chinese male surgeons.

Methods—A total of 823 Chinese male surgeons from six cities in China participated in a survey of smoking knowledge, attitudes, and behaviors in 2004. This study presents descriptive statistics and logistic regression analyses of factors associated with the respondents' smoking behavior and smoking cessation activity.

Results—The current smoking prevalence for Chinese male surgeons was 45.2%, of which 42.5% reported having smoked in front of their patients. Few of the respondents always asked patients about their smoking status (25%) or advised smokers to quit smoking (27.2%). Logistic regression models found that current smoking status was significantly associated ($p<0.05$) with the surgeons' knowledge about the harms of active and passive smoking and their attitudes towards smoke-free hospitals and health role modeling by physicians. Smoking in front of patients was significantly associated ($p<0.05$) with the respondents' knowledge of active smoking harms, attitudes towards smoke-free hospitals, and cigarette consumption. Their smoking cessation activity was significantly associated ($p<0.05$) with their knowledge about the harms of active smoking, their rates of advising patients to quit smoking, and their knowledge of the harms of passive smoking.

Conclusions—Male surgeons have the highest smoking prevalence among Chinese physicians. They should actively participate in tobacco control training and education to improve their knowledge and attitudes toward smoking, which will improve their own smoking behavior and smoking cessation practices. Only by engaging all parts of the health care system, including surgeons, can China make headway against its tobacco epidemic.

Introduction

China produces one third of the world's tobacco supply and has the largest number of cigarette consumers in the world;[1] consumption was 1.7 trillion cigarettes (1/3 of the world's total) in 2000.[2] The smoking prevalence in China also is the highest in the world; in 2002, about 300 million adults (age ≥ 15) were current smokers.[3] Ever-smoking rates among adults were 66.0% for men and 3.1% for women,[4] and current smoking rates were 58.2% for men and 2.6% for women.

A study conducted in China in 2004 surveyed 3,652 Chinese physicians and found that the smoking prevalence was 23% among all Chinese physicians, 41% for men and 1% for women.[6] In particular, surgeons had the highest smoking prevalence of all physicians (48.1%)[27], a finding demonstrated in many other studies.[15, 22–26] However, little information is available about the factors that underlie these findings. Previous studies have reported that cigarette smoking produces *guanxi* (social relationships).[28,29] A study in 2008 reported that cigarette smoking among Chinese surgeons is a pivotal element in a highly embodied set of

Conflict of Interest
No financial conflict of interest was reported by the authors of this paper.

organizational practices and ethics[30] and likely limits the development of effective tobacco prevention and control programs. Surgeons can play an important role in tobacco control. They care for many patients with smoking-related illnesses, such as lung cancer and cervical cancer, and they can help prevent or minimize these illnesses by acting as healthy role models by changing their own smoking behavior and their smoking cessation practices towards patients. In addition, patient illnesses may be aggravated by exposure to secondhand smoke from surgeons who smoke in front of them. Therefore, the main objectives of this study were to determine the smoking knowledge, attitudes, and behavior of male surgeons in China and whether their smoking behavior and smoking cessation activity were affected by modifiable factors such as their knowledge and attitudes toward smoking.

Methods

Sample

This survey of male surgeons' knowledge, attitudes, and behavior toward smoking was conducted from July 2004 to October 2004 in six cities in China: Guangzhou, Chengdu, Wuhan, Tianjin, Harbin, and Lanzhou. These cities represent six different regions in China: south, southwest, central, north, northeast, and northwest. In each city, five hospitals were randomly selected within the provincial, city, and district levels. A total of 949 surgeons participated in the survey: 13.3% of the surgeons were female but only 1.6% (n=2) of them were current smokers, which is consistent with female smoking rates in China.[5,6] Consequently, this study focused only on the smoking knowledge, attitudes, and behavior of the 823 male surgeons. When the term "respondents" is used, it refers only to the male surgeons in the study.

Design and Procedures

This study was approved by the Institutional Review Boards of the Chinese Center for Disease Control and Prevention and the University of California, Berkeley. Participants were contacted by telephone and asked to participate in a face-to-face interview and complete a self-administered questionnaire. The face-to-face interviews were conducted by staff members of the Chinese Center for Disease Control and Prevention. The questionnaire consisted of four sections with 112 total questions. The first section asked questions about the male surgeons' smoking cessation counseling behavior. The second section asked questions about their smoking and their quitting smoking behavior. The third section contained 52 scaled questions that assessed the surgeons' knowledge about their role in smoking prevention and control, smoking-related and passive smoking-related diseases, and methods of smoking cessation. The fourth section contained six demographic questions (age, years of practice, education, position, number of patients per day, and monthly income). To ensure the quality of data collection, 10% of the questionnaires were examined by a quality control team in each city every day.

Statistical Analysis

All analyses were conducted with STATA, version 9.0 (Stata Corporation, College Station TX, 2003). A descriptive analysis was performed for demographic features (Table 1). Differences in proportion were assessed by Pearson chi-square test (Table 2). Previous studies have shown that lack of knowledge and inappropriate attitudes towards smoking can influence physicians' smoking behavior,[14,16] but these studies were not conducted specifically with Chinese male surgeons. This study used three logistic regression models to analyze factors related to the male surgeons' smoking status, smoking behavior in front of patients, and smoking cessation activity (Table 3, Table 4, Table 5). Odds Ratios (OR) and the corresponding 95% Confidence Intervals (CI) were computed to assess the strength of association. For the logistic regression analyses, the respondents' smoking status and smoking behavior among current smokers were dichotomized into current smokers (daily smokers and occasional smokers) and nonsmokers (past smokers and never smokers), and into smoking and not smoking in front of patients,

respectively. Smoking cessation activity was also dichotomized into (1) always (always or often) and not always (sometimes or rarely or never) asks if a patient smokes, and (2) always (always or often) and not always (sometimes or rarely or never) advises smokers to quit smoking. Analyses accounted for clustering at the city and type of hospital.

This study focused on four groups of explanatory variables in the logistic regression models: (1) professional background, which includes the surgeons' years of practice, education, position, and city; (2) knowledge about the relationship between active smoking and health, and between passive smoking and lung cancer; (3) attitudes regarding whether "health professionals should serve as role models for patients" and "all indoor smoking in hospitals should be prohibited"; and (4) smoking behavior, measured both as smoking in front of patients, and the amount of cigarettes smoked per day. The key variables of interest are in the last three groups, since they are more modifiable than demographic characteristics. The knowledge variables previously had been shown to differ significantly between physician smokers and nonsmokers but had not been analyzed for their effect on smoking cessation practices.[6] Responses related to knowledge and attitudes were grouped into "agree (related)" and "probably or not agree (probably related, not related, unknown)" and "oppose (strongly oppose, oppose, neutral)" and "support (supportive, strongly supportive)", respectively. A P value of <0.05 was considered statistically significant, with all P values being two-tailed.

Results

Demographic Data

Table 1 shows the demographic data for the 823 male surgeons participating in this study. Their mean age was 38, and 59.2% (n=487) had worked more than 10 years. Most (n=669, 81.3%) had at least a bachelor's medical degree, and 33.8% (n=278) held an associate or senior position. Among all of the respondents, 19.3% were from Guangzhou, 17.6% from Chengdu, 19.4% from Wuhan, 12.9% from Tianjin, 13.7% from Harbin and 17% from Lanzhou. The Chi-square analysis indicates that significant differences in smoking status were found between subgroups of age, years of practice, education, position, and city.

Smoking Prevalence

The current smoking prevalence for the Chinese male surgeons in the study was 45.2%(n=372). The smoking prevalence was highest (37.1%) in the middle-age group (30–39 years), with lower rates among younger and older surgeons. Among current smokers, over half (52.4%) smoked less than half a pack of cigarettes daily, and the average number of years smoked was about 14 years. The three most commonly reported reasons for smoking were: (1) smoking makes me feel relaxed; (2) it is necessary for social activities; and (3) smoking is a habit in my daily life. Of note, 42.5% (n=158) of the current smokers in the study reported having smoked in front of their patients, and over half (60.8%) claimed to have made at least one attempt to quit smoking.

Knowledge and Attitudes toward Smoking

Table 2 describes the knowledge and attitudes of the male surgeons towards smoking. Current smokers were significantly less likely than nonsmokers to believe smoking is harmful to health (49.7% vs 70.7%, $p<0.05$) and that passive smoking is related to lung cancer (82.3% vs 89.8%, $p<0.05$). Current smokers also were significantly less likely ($p<0.05$) than nonsmokers to support the views that: (1) health professionals should serve as role models for their patients (73.7% vs 87.1%, $p<0.05$), and (2) all indoor smoking in hospitals should be prohibited (68.6% vs 86.9%, $p<0.05$).

Current smokers who had ever smoked in front of patients, compared to those who never had done so, were significantly less likely to believe that smoking is harmful to health (42.7% vs 55.1%, $p<0.05$) and that all indoor smoking in hospitals should be prohibited (61.3% vs 74.2%, $p<0.05$). Current smokers who had ever smoked in front of patients, compared to those who never had done so, were less likely (although not significantly) to know that passive smoking is related to lung cancer or to believe that health professionals should serve as role models for patients (81.5% vs 82.7 %, $p>0.05$; 71.0% vs 76.1%, $p>0.05$).

Smoking Behavior and Associated Factors

Smoking status (Table 3) was significantly associated ($p<0.05$) with the respondents' professional background (education, position, city), and also with their knowledge and attitudes toward smoking. Male surgeons who did not agree that active smoking is harmful to one's health (OR = 2.48) or that passive smoking is related to lung cancer (OR = 2.01) were more likely to smoke than those who agreed with these respective statements. Male surgeons who did not agree that health professionals should serve as role models for their patients (OR = 1.74) or that indoor smoking should be prohibited (OR = 3.09) were more likely to smoke than those who agreed with the respective statements.

This study found that professional background (years of practice), knowledge and attitudes towards smoking, and smoking intensity were significant predictors ($p<0.05$) of having ever smoked in front of patients (Table 4). Male surgeon smokers who had practiced more than ten years were more likely to have smoked in front of patients. Male surgeons who did not completely agree that smoking is harmful to health were more likely (OR = 1.64) than those who completely agreed to have smoked in front of patients. Male surgeons who did not believe hospitals should be completely smoke-free were more likely (OR = 1.81) than those who did believe that hospitals should be completely smoke-free to have smoked in front of patients. Male surgeons who smoked more than a half pack of cigarettes daily were more likely (OR = 2.67) to have smoked in front of patients than those who smoked a half pack or less of cigarettes daily. Knowledge about smoking harms and attitudes about role modeling were not significant predictors of having ever smoked in front of patients.

Smoking Cessation Activity

In this study, only 25% of the Chinese male surgeons always asked patients about their smoking status. Among those surgeons who never or seldom asked their patients about smoking status, the main reason given for not asking was "patient's condition is not related to smoking" (45.3%). In addition, only 27% of the male surgeons always advised their patients to quit smoking. Among those respondents who never or seldom advised their patients to quit, the main reason given was the belief that "they could not influence a patient" (39.4%).

This study found (Table 5) that the male surgeons' "ask" behavior was significantly associated ($p<0.05$) with their professional background (education, position, city) and their knowledge about smoking. Those who completely agreed with the statement that "smoking is harmful to health" were 1.45 times more likely(OR=0.69) than those who did not completely agree with this statement to always ask if a patient smokes. Knowledge that passive smoking is related to lung cancer and attitudes about role modeling and smoking bans in hospitals were not significantly associated with the male surgeons' "ask" behavior. The respondents' "advise" behavior was significantly associated ($p<0.05$) with their knowledge. Those who completely agreed that smoking is harmful to health and that passive smoking is related to lung cancer were 1.47 times (OR=0.68) and 1.82 times (OR=0.55), respectively, more likely to always advise smokers to quit than those who did not completely agree with these statements. Attitudes about role modeling and smoking bans in hospital were not significant predictors of the male surgeons' "advise" behavior.

Discussion

This study focuses on the smoking knowledge, attitudes, and behavior of Chinese male surgeons and examines how their knowledge and attitudes affect their smoking behavior and smoking cessation activity.

The Chinese male surgeons in the study had the highest smoking prevalence (45.2%) of all physicians, which potentially means a higher death rate among surgeons. A study of 34,439 British male doctors showed that those who continued to smoke cigarettes lost, on average, about 10 years of life compared with nonsmokers.[36] The Chinese government invests a lot in the development of health care professionals, from medical school education to hospital training; high death rates among physicians caused by smoking-related diseases represent a huge loss to society. In addition, physicians are among the most influential role models to the general population. The high smoking prevalence among Chinese male surgeons provides an unhealthy role model for patients. Thus, it is necessary to take effective measures to reduce the smoking prevalence among male surgeons in China.

Education is important to improve male surgeons' knowledge and attitudes towards smoking. Previous research has shown that surgeons have a much lower quitting rate and lower scores on knowledge and attitudes toward smoking than internists.[27] This study suggests that improving male surgeons' knowledge and attitudes towards smoking will have a significant impact on their smoking status, their smoking behavior in front of patients, and their smoking cessation activity. There are two feasible ways to educate male surgeons: (1) implement continuous education and training for current male surgeons on smoking harms and cessation effectiveness, through such methods as health education lectures and smoke-free brochures.; (2) add appropriate content and practice on tobacco-related matters, from smoking prevention to cessation and policy, into the medical school curricula for future male surgeons.

Health professionals should have confidence in the impact of smoking cessation practices. This study found that many of the respondents perceived that their smoking cessation advice would not have an effect on patients. However, smoking cessation activities by male surgeons can have a significant positive impact on quitting by patients. According to previous studies, a patient's desire to quit smoking is correlated with a doctor's advice to quit.[37] Another study showed that 40% of smokers attempted to quit in response to a doctor's advice.[11] A meta-analysis of 26,000 smokers also confirmed that very brief advice from a physician would significantly increase the rate of quitting smoking among patients.[38,39] Therefore, it should be the goal of every physician to always ask all their patients if they smoke, advise smokers to quit, and use recommended strategies that take only a short time to perform.[12] Doing so would have a huge influence on reducing Chinese smoking rates.

Although many hospitals in China have already nominally implemented smoke-free policies, the high rate of smoking in front of patient shows that it is still necessary to strengthen these policies. A major barrier to the implementation of smoke-free policies in Chinese hospitals is the common practice of patients' relatives proffering cigarettes to doctors.[30] It has also been reported that smoking behavior by the director and other senior members of the ward hospital staff influences smoking behavior by junior surgeons.[35] Education of surgeons, who have the highest rate of smoking among Chinese physicians, combined with a media campaign about the importance of smoke-free policies to influence the public, could help strengthen smoke-free policies in hospitals. Smoke-free hospitals could not only reduce smoking activity and improve patient health, but they also could protect nonsmokers from passive smoking.

A limitation of this study is that it relies on self-reported smoking behavior. It is possible that social desirability may result in bias in our estimates of male surgeons' attitudes and behavior

concerning smoking cessation activities. This study also did not examine male surgeons in rural areas, where 60% of the Chinese population resides.

In conclusion, this study shows a high smoking prevalence among male surgeons in China. Male surgeons should actively participate in tobacco control training and education to improve their knowledge and attitudes toward smoking. Doing so will lead to improvements in surgeons' own smoking behavior, as well as their asking about patient smoking status on a routine basis and encouraging smokers to quit. Only by engaging all parts of the health care system, which includes surgeons, can China make headway against its tobacco epidemic.

Acknowledgments

The authors would like to thank Professor Teh-wei Hu of the University of California, Berkeley, for his comments on the manuscript. This study was supported by the U.S. National Institutes of Health, Fogarty International Center (grant R01 TW05938).

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Table 1

Demographic characteristics of male surgeons in China (n=823)

Characteristic	Total %, (n=823)	Current smoker %, (n=372)	Non smoker %, (n=451)	*P* value
Age				.000
20–29	27.0 (221)	18.3 (68)	34.2 (153)	
30–39	34.9 (286)	37.1(138)	33.1 (148)	
40–49	19.8 (162)	23.7 (88)	16.6 (74)	
50–69	18.3 (150)	21.0 (78)	16.1 (72)	
Years of practice				.000
<10 years	40.8 (335)	29.0 (108)	50.4 (227)	
≥10 years	59.2 (487)	71.0 (264)	49.6 (223)	
Education				.001
≤College	18.7 (154)	23.7 (88)	14.6 (66)	
Bachelor	68.2 (561)	66.1 (246)	69.8 (315)	
Master/MD	13.1 (108)	10.2 (38)	15.5 (70)	
Position				.000
≤Junior	32.5 (267)	23.1 (86)	40.2 (181)	
Middle-career	33.7 (277)	35.5 (132)	32.2 (145)	
Associate and senior	33.8 (278)	41.4 (154)	27.6 (124)	
City				.000
Guangzhou	19.3 (159)	12.6 (47)	24.8 (112)	
Chengdu	17.6 (145)	15.9 (59)	19.1 (86)	
Wuhan	19.4 (160)	20.4 (76)	18.6 (84)	
Tianjin	12.9 (106)	15.3 (57)	10.9 (49)	
Harbin	13.7 (113)	14.0 (52)	13.5 (61)	
Lanzhou	17.0 (140)	21.8 (81)	13.1 (59)	
Amount of cigarettes smoked per day				
≤half pack	(195)	52.4	0.0	
> half pack	(177)	47.6	0.0	

Table 2

Male surgeons' knowledge and attitudes toward smoking and passive smoking

	All (n=823)		Current smoker (n=372)	
	Current smoker (n=372) %	Non smoker (n=451) %	Smoking in front of patients (n=158) %	Not smoking in front of patients (n=214) %
Knowledge				
Smoking is harmful to your health [a,b]				
Agree	49.7	70.7	42.7	55.1
Probably or not agree	50.3	29.3	57.3	44.9
Passive smoking is related to lung cancer [a]				
Agree	82.3	89.8	81.5	82.7
Probably or not agree	17.7	10.2	18.5	17.3
Attitudes				
Health professionals should serve as role models for patients [a]				
Support	73.7	87.1	71.0	76.1
Oppose	26.3	12.9	29.0	23.9
All indoor smoking in hospitals should be prohibited [a,b]				
Support	68.6	86.9	61.3	74.2
Oppose	31.4	13.1	38.7	25.8

[a] Significant (P<0.05) difference between current smoker and nonsmoker.

[b] Significant (P<0.05) difference between smoking and not smoking in front of patients

Table 3

Logistic regressionof factors associated with male surgeons' smoking status (n=823)

	Coefficient	OR	95% CI
Professional background			
Years of practice			
<10 years		Reference	
≥10 years	0.35	1.41	0.84–2.39
Education			
≤College		Reference	
Bachelor	−0.50	0.61 *	0.40–0.94
Master/MD	−0.88	0.42**	0.23–0.77
Position			
≤Junior		Reference	
Middle-career	0.57	1.77*	1.08–2.91
Associate and senior	0.87	2.38**	1.26–4.48
City			
Guangzhou		Reference	
Chengdu	0.75	2.12**	1.23–3.66
Wuhan	0.94	2.56**	1.50–4.37
Tianjin	1.40	4.04**	2.23–7.33
Harbin	1.07	2.92**	1.62–5.25
Lanzhou	1.81	6.08**	3.46–10.69
Knowledge			
Smoking is harmful to your health			
Agree		Reference	
Probably or not agree	0.91	2.48**	1.80–3.44
Passive smoking is related to lung cancer			
Agree		Reference	
Probably or not agree	0.70	2.01**	1.25–3.22
Attitudes			
Health professional should serve as role models for patients			
Support		Reference	
Oppose	0.55	1.74*	1.09–2.77
All indoor smoking in hospitals should be prohibited			
Support		Reference	
Oppose	1.13	3.09**	1.97–4.84
Constant	**−2.21**		

χ^2=184.246, df=14, p<0.000

*P<0.05 (2-tailed),

** P<0.01 (2-tailed)

Note: The first category in all variables was regarded as the reference category

Table 4

Logistic regressionof factors associated with male surgeons' smoking in front of patients (n=372)

	Coefficient	OR	95% CI
Professional background			
Years of practice			
<10 years		Reference	
≥10 years	0.71	2.04*	1.09–3.83
Education			
≤College		Reference	
Bachelor	−0.29	0.75	0.43–1.33
Master/MD	−0.64	0.53	0.22–1.28
Position			
≤Middle-career		Reference	
Associate and senior	0.33	1.39	0.79–2.43
Amount of cigarette smoked per day			
≤half pack		Reference	
>half pack	0.98	2.67**	1.70–4.20
Knowledge			
Smoking is harmful to your health			
Agree		Reference	
Probably or not agree	0.49	1.64*	1.04–2.57
Passive smoking is related to lung cancer			
Agree		Reference	
Probably or not agree	0.05	1.05	0.58–1.91
Attitudes			
Health professional should serve as role models for patients			
Support		Reference	
Oppose	0.02	1.02	0.57–1.84
All indoor smoking in hospitals should be prohibited			
Support		Reference	
Oppose	0.60	1.81*	1.05–3.12
Constant	**−1.68**		

χ^2=52.339, df=9, p<0.000

*P<0.05 (2-tailed),

**P<0.01 (2-tailed)

Note: The first category in all variables was regarded as the reference category

Table 5

Logistic regressionof factors associated with male surgeons' smoking cessation activity (n=823)

	(1) Always asked if a patient smokes		(2) Always advised smokers to quit	
	Coefficient	**OR (95% CI)**	**Coefficient**	**OR (95% CI)**
Professional background				
Years of practice				
<10 years		Reference		Reference
≥10 years	−0.29	0.75 (0.41–1.36)	−0.03	0.97 (0.54–1.75)
Education				
≤College		Reference		Reference
Bachelor	0.92	2.52* (1.48–4.30)	0.46	1.58 (0.96–2.62)
Master/MD	0.44	1.56 (0.75–3.22)	0.40	1.50 (0.76–2.94)
Position				
≤Junior		Reference		Reference
Middle-career	−0.56	0.57* (0.34–0.96)	−0.39	0.68 (0.40–1.15)
Associate and senior	−0.20	0.82 (0.41–1.65)	−0.19	0.83 (0.41–1.65)
City				
Guangzhou		Reference		Reference
Chengdu	0.60	1.83* (1.01–3.33)	0.33	1.40 (0.79–2.46)
Wuhan	0.80	2.23* (1.26–3.95)	0.33	1.39 (0.79–2.42)
Tianjin	0.78	2.17* (1.16–4.09)	0.35	1.42 (0.78–2.60)
Harbin	0.75	2.11* (1.13–3.95)	0.51	1.67 (0.92–3.02)
Lanzhou	0.66	1.93* (1.06–3.52)	−0.10	0.91 (0.50–1.65)
Knowledge				
Smoking is harmful to your health				
Agree		Reference		Reference
Probably or not agree	−0.38	0.69* (0.48–0.98)	−0.39	0.68* (0.47–0.97)
Passive smoking is related to lung cancer				
Agree		Reference		Reference
Probably or not agree	−0.50	0.95 (0.58–1.57)	−0.60	0.55* (0.32–0.96)
Attitudes				
Health professional should serve as role models for patients				
Support		Reference		Reference
Oppose	0.47	1.60 (0.99–2.59)	0.16	1.18 (0.71–1.95)
All indoor smoking in hospitals should be prohibited				
Support		Reference		Reference
Oppose	−0.21	0.81 (0.50–1.31)	−0.49	0.61 (0.37–1.02)
Constant	**−1.92**		**−1.10**	

(1) χ^2=56.94, df=14, p<0.000;

(2) χ^2=29.16, df=14, p<0.000

*P<0.05 (2-tailed),

**P<0.01 (2-tailed)

Note: The first category in all variables was regarded as the reference category